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Protection of the Yellowstone Park.

IT is to be hoped that Congress will take some definite action this winter on the bill now before the House of Representatives for the enlargement, protection and maintenance of the Yellowstone Park. The preservation of the national park is a matter in which a large number of people throughout the country feel a deep interest and patriotic pride. They believe in its preservation for the purposes for which it was originally set aside, and at the same time realize its importance from an economic point of view. Thousands of citizens have memorialized Congress for the passage of some measure looking to its better protection.

The park is a high plateau with an average elevation of nearly 8,000 feet, surrounded on nearly all sides by mountains rising from 2,000 to 3,000 feet above this broad tableland. Numerous streams from the high mountains pour their waters into the park, from which, by means of three large rivers, the greater part of it leaves this elevated country for the more arid regions below. Hundreds of lakes, many of them of large size, lie scattered over the plateau. Yellowstone Lake, one of the grandest bodies of water in the world at so high an altitude, presents a magnificent natural reservoir twenty miles in length, with a breadth, across its greatest expansion, of fifteen miles. Two large rivers, the Yellowstone and the Snake, find their sources in these lakes and mountain recesses. In all the vast Rocky Mountain country there are few, if any, areas of equal extent so admirably adapted for a national forest-reservation, and none which present greater advantages as a natural reservoir for the storage of water. Over eighty per cent. of the park country is covered with a coniferous forest. For the collection and preservation of this water supply the forest of the park and the adjacent territory is of incalculable value. It is indeed a prime necessity. The importance of this water in an arid region, and one with a constantly increasing population, cannot be overestimated. It is safe to say that without the forest and with the diminished water supply, which would naturally follow, the grand scenic effects of the park would be wholly wanting. The geysers, hot springs and water-falls would be despoiled of their charm.

At the time the park was originally set aside as a pleasure-ground for the people the boundaries were very loosely defined, the country being almost a *terra incognita*. With our present knowledge of the physical features of the region these errors can easily be rectified. The proposed bill enlarges the park to the south and west, including a large area of forest-covered mountains now wholly unprotected. These mountain lands are useless for agricultural and grazing purposes, but they are invaluable as the sources of the main streams and the feeders of the Yellowstone Lake and Snake River. Besides its economic value, this proposed extension of the reservation would give to the park picturesque valleys and bold panoramic scenery, both of which it now in a great measure lacks.

A bill to meet the present requirements of the park has been before Congress for eight years. It has passed the Senate four times, only to be lost in the House. In the present Congress a carefully considered bill has passed the Senate, and has been reported to the House from committee with one or two amendments. No objection whatever is raised to the proposed enlargement or the provisions made for the punishment of criminal offenses committed within the reservation, the two most important objects of the bill. Yet the bill is again liable to fail of becoming a law owing to a small but persistent lobby, who are determined that it shall not pass without an amendment granting an exclusive privilege to a railway company to lay fifty or sixty miles of track in order to reach Cooke, a small mining camp lying just outside the north-east corner of the park.

Those interested in the park, for many obvious reasons, object to the admission of any railway. They see in such an admission the beginning of the end. They are quite willing to adjust the northern boundary so as to allow not only the railway but traffic of all kinds to reach the mines without going through the reservation. This object can be easily attained by making the Yellowstone River the north-eastern boundary, an excellent physical feature which all could recognize. Curiously enough the Montana Mineral Railway Company, the corporation asking for this franchise, objects to this adjustment of the northern boundary, because, as they say, it would allow any railway to build to Cooke. What they really desire, it seems, is an exclusive privilege which the proposed amendment would give them, and without which they oppose the bill. It is far better that people along the line of the railway should live under state jurisdiction rather than reside within the reservation. The people interested in Cooke, who consider a railway essential for the development of their property, prefer that the track should run wholly outside the park. They are becoming irritated at the delays caused by the small number of individuals who, for their own personal ends, object to any modification of the boundary and insist upon the railway running through the park.

Since the matter was first agitated in Congress large tracts of the country which it is proposed to add to the park have been devastated by forest-fires either maliciously or carelessly started. Large herds of elk, deer, sheep and moose have been wantonly slaughtered for their hides by skin-hunters. By those qualified to give an opinion, it is stated that the country immediately south of the park, which it is proposed to add to it, is one of the favorite breeding places of the elk. Secretaries Lamar, Vilas and Noble have each in their annual reports urged the passage of a similar bill to this one now before Congress. It is certainly not too much to ask of Congress that they take some action in this matter and protect from vandalism of all kinds this most valuable forest and game reservation.

THE New York Society for Parks and Playgrounds was recently incorporated at Albany. Its President is the Hon. Abram S. Hewitt. Among its Trustees are Dr. Felix Adler, Mr. De Witt J. Seligman and Mr. Andrew H. Green, and among its other incorporators are Bishop Potter and Mr. Erastus Wiman. These names we cite from a much longer list to show that neither sectarian nor political influences will control the new organization, but a pure desire on the part of representative citizens of all kinds to promote the welfare of the poor children of New York. One of the Trustees, in an interview reported in the New York *Sun*, says that the first object of the Association will be to obtain a greater number of suitable places in our larger parks where children of all ages will be allowed to play and can be provided with inexpensive amusements like heaps of sand and swings. Then vacant lands will be rented for temporary playgrounds in various localities, and an effort will be made to obtain an exemption from taxation for such lands. Below Fourteenth Street, where unimproved lots can hardly be found, play-houses will be established to take, as far as possible, the place of open grounds. The city authorities will be influenced to provide without delay the small parks in thickly populated districts which were authorized by the act of 1887 while Mr. Hewitt was Mayor; and arrangements will be made for sending bodies of children to the parks in summer under proper control and guidance, so that their diversions may be healthful and safe. To secure competent superintendence for the different play-grounds will, of course, be one of the most difficult tasks of the Society; but the aid already promised by Mr. D. J. H. Ward, the instructor of Dr. Adler's well known school, and by such experienced teachers as Professor Woodhull, promises well for success in this direction. The good which this Society may do is incalculable, and it is to be hoped that it will have generous support. Much more will be secured than the temporary amusement and the physical improvement of poor children. Such influences as will be brought to bear upon them ought to have a far-reaching effect upon the development of their characters and their intelligence, and these proposed playgrounds, and the devoted teachers who will superintend them, may rescue many little ones from lives of degeneracy and crime.

There is little fear that the united judgment of the organizers of this movement will countenance any project which may be objectionable. A few zealous friends of the children seem to forget that there are larger people who have equal need of playgrounds, and they are urging some very destructive changes in the design of Central Park. It will not be necessary to sacrifice the beauty of the park, which means its highest usefulness, to make provision for the children. Park ground is a necessity as well as playground, and the growing city must have more of both.

Private Grounds and Enclosures in Cities and Towns.—I.

THERE is a strong contrast between American and European ideas as to the character and function of private grounds, be the area surrounding a house large or small. In Europe the idea is that of seclusion; in the United States it is rather one of inclusion. In Europe the space surrounding the dwelling is treated as an out-door extension of the dwelling itself; a high wall encloses it, and so sacred is its privacy that the gaze of a stranger into its precincts is held as something to be guarded against almost as rigorously as actual trespass. Not only is this the case with country or suburban grounds, but in England, in cases where city houses chance to have an area of a few yards between their fronts and the street, this space is also habitually shut in with a high and solid wall.

With us, the ground surrounding a dwelling is treated, in effect, as an intermediate territory; a transition between the freedom of the public way and the privacy of the household. This character has been intensified, rather than diminished, of late years, with the growth of wealth and æsthetic culture in our country. In our suburbs the tendency is toward the removal of all barriers, not only between the house-grounds and the street, but also the elimination of all boundary marks between the grounds of adjacent dwellings, giving the houses of a neighborhood the appearance of standing in a space common to them all.

It would be an interesting task to trace the reason for this radical departure from the domestic traditions of our race in the Old World, but it might require a research in the province of sociology so extensive as to forbid present consideration. Our democracy undoubtedly has something to do with it. While possibly a minor motive may be the indulgence of a love of display, harmless in such a manifestation, this characteristic seems more likely to proceed from an intuitive recognition of the fundamental fact of a democratic commonwealth: That the individual is a portion of the public, to which he owes the duty of sharing, so far as he may, the enjoyment of the things of beauty that he may be privileged to possess.

There are desirable elements in both systems, and it would be an excellent thing could the best features of each be combined. The American custom contributes largely to the adornment of the town or city; the placing of dwellings in such relations to each other and to the public creates an atmosphere of frankness, of hospitality, and of neighborhood friendliness and freedom. It also cultivates the virtue of voluntary respect for private rights and privileges, and it is notable that in communities where this absence of bounds and barriers prevails, the abstention from trespass is, at least, as marked as where walls, hedges and fences forbid passage. Exclusiveness is a habit not native to Americans, and in our out-door life there is little disposition to avoid the public gaze. Upon our private grounds it is customary to play at tennis, croquet and other games with entire indifference to lookers-on from the adjacent highway.

Yet there is a great charm in a "close"; in an open place securely walled or hedged about, where members of the household may enjoy the open air in the same seclusion that exists within the walls of the dwelling. An advantage of such a feature, besides its retired character, consists in the possibility of its use at times and seasons when resort to the more open grounds might be inconvenient or uncomfortable. There is more likelihood of shelter from winds that in an exposed situation would be unpleasant at times; and this shelter would enable its use on pleasant days both earlier in the spring and later in the autumn than would be practicable otherwise. It is true that the broad piazzas peculiar to the better class of rural dwellings in this country largely answer to purposes of this nature, yet in certain respects they do not fully serve as substitutes for the "close."

The treatment of this feature should, of course, be quite different from that of open grounds; its service as an out-door portion of the dwelling should be markedly recognized in a more formal treatment, possibly combining the garden, the bower, and a suggestion of the conservatory, with the free use of tender and tropical plants in ornamental pots. Some sheltered angle beside or behind the house should be chosen, with careful reference to prevailing winds and to the sun, and the enclosing wall could easily be made a pleasing feature of the architecture of the house.

Boston. *Sylvester Baxter.*

The Autumn Flora of the Lake Michigan Pine Barrens.—I.

IT is the good fortune of botanists and admirers of our native plants who live at Chicago to have within a short distance of the city a region as yet but little disturbed by the hand of man. A ride of a few miles takes one to a Pine-barren and a succession of sand hills and dunes extending around the head of Lake Michigan to Michigan City and beyond. And one can hardly avoid entertaining the hope, even at the expense of the owners of the property, that it will remain in this condition for some time to come. Though factories and dwelling houses have sprung up in the woods and swamps, one can still roam over spots where towns only exist on maps and in the minds of speculators. And since the value of the land to the cultivator is slight, though yielding fair returns to the market-gardener where the sands are not shifting, the prospect of speedy settlement is not bright. The scanty timber spared by numerous fires and springing up in their track is mainly composed of Pines and Oaks, with Cedars, Poplars, Birches, Tupelo and Sassafras in localities suited to their growth. The western part of the region is low and generally swampy, the long ridges of sand rising but slightly above alternating sloughs running parallel with them and the shore of the neighboring lake. Eastward the wind has piled the sand into hills, the depressions among them being dry or occupied by ponds and swamps. There is much less regularity in

the surface structure than in that of the western part. The hills are mostly held in position by a scattered growth of trees and shrubs and plants characteristic of the sand dunes, except near the shore, where the wind piles the sand into great drifts, which often change their form and position. There is a rich variety in the plants of the whole region, when we take into account the entire season of growth, although the conditions of soil and moisture, and the modifying influence of the lake, are very variable. It is the autumnal flora of the western or more typical Pine-barrens which I purpose to notice in its most striking feature, as seen in the month of September. From the eighty to one hundred plants whose season is autumnal or reaches over into autumn, I have selected the following as most characteristic.

The Golden-rod claims more than a dozen species; two of these are the most abundant, each in the place most suited to its growth. *Solidago nemoralis* grows throughout in the dry grounds, its grayish stem and leaves according well with the color of the ground beneath. *S. Ohioensis* takes the grassy borders of the sloughs or the moist and open spaces, which it clothes with stretches of yellow, often of great extent. It is a smooth plant, about two feet high, with narrow leaves, the radical pretty long; the stem is terminated by a showy corymb from two to six inches in diameter. Close by the lake is a peculiar species, *S. humilis*, or this species running into the variety *Gilmani*. It is confined to the ridge of sand that skirts the shore, and is very local in this respect. The flower-heads are large, few in number and nearly sessile along the upper part of the stem. Several stems, some of them three feet long at times, usually spring from the same roots and rise obliquely in different directions. One of the handsomest kinds is *S. speciosa* or its variety *angustata*. They bear a long thyrse-like panicle of bright flowers, with the smooth stems densely covered by thick leaves, making a very sleek looking plant. These occasionally branch at the top, forming a cluster of thyrsoid panicles. They are found in the driest situations, and when massed, as they sometimes are, the effect is very showy. *S. Riddellii* is a companion of *S. Ohioensis*, but is much less seen in the barrens than in prairie regions. It has a corymb much like that of the latter, but more compact. It is very distinctly marked by its narrow, conduplicate leaves, sheathing the stem at their insertion and gradually curving away from it. Fine specimens of *S. rugosa* are also found here, well distinguished by its peculiar rugose leaves from the allied species, *S. ulmifolia*, seen also in the regions clothed with Oaks and White Pines.

The most showy plants upon the ridges are two species of Liatris or Blazing Star, *L. scariosa* and *L. cylindracea*. Then in the same localities as *Solidago Ohioensis*, *L. spicata* is abundant. All bear very bright, bluish purple flowers, crowded along the upper part of the stem. *L. spicata* has a dense spike of heads, individually smaller than those of the others, but so compact and covering the stem to such a length that its top is a cylindrical mass of bloom, contrasting well with the yellow of the more humble Golden-rods around it. *L. scariosa* bears a similar spike, but it is not generally as long, though the heads are larger, but less closely placed. *L. cylindracea* is the smallest of the three, with a few but prominent heads, having a long, cylindrical involucre. The most symmetrical of them is *L. spicata*; its numerous linear leaves, long near the ground, shorten so gradually that the plant tapers very evenly from the base to the beginning of the spike. *L. scariosa* has the handsomest inflorescence, not only on account of its larger heads and flowers, but its buds, often furnished with bright reddish purple scales. Their season of blooming does not agree throughout. *L. cylindracea* and *L. spicata* begin to flower about the same time, but the latter lasts considerably longer. *L. scariosa* starts later and goes on into October. The first of these is out of flower when the last is at its best, and when the top of the spike of *L. spicata* wears a withered and rusty look. This last feature detracts from the beauty of a Liatris, since the mode of inflorescence being from above downward, the withered flowers are more obtrusive than if the heads unfolded the opposite way. This is specially remarked when the spike is long, for a stem ending in buds is more attractive to the eye than one ending in dead flowers, or, in most cases, in fruit. An additional charm is provided for the flowers of Liatris on sunny days in autumn, since they are selected almost exclusively for the visits of the large Archippus Butterfly (*Danais Archippus*, Fabr.), hundreds of whom are seen flying overhead or lighting on the flowers to sip their nectar, gently opening and closing their many colored wings while busied in this act.

The principal Aster of the early fall is *A. ptarmicoides*. It is exceedingly abundant, and everywhere specks the dry grounds with white corymbs. A few plants of *Euphorbia corollata* still linger upon the ridges to contribute to this effect, just as earlier in the season they had been equally numerous and effective in whitening the same ridges. Sometimes *A. linarifolius* will be found a common plant on some of the ridges. It reaches about the same height as the former, but is more showy, its larger heads having violet rays. Though each stem commonly bears but a single head, they are apt to obviate their lack of effect in this regard by producing several stems from the same root. Another denizen of the dry grounds is *A. sericeus*. Its heads are large, with rays of violet-blue. Its small but shapely leaves, covered with a silky pubescence, making them as soft as mouse-ears, and its silvery look, render it one of the most elegant of our Asters, though it is a small plant. The three range from one to two feet high. In early fall *A. umbellatus* is common in wettish grounds. Its heads of white flowers, though few-rayed, are quite large, and in sufficient number to make its corymb prominent amid the clumps of low bushes where it most delights to grow. Its elongated leaves, tapering and finely shaped, help to make it an attractive plant. About this time *A. multiflorus* is seen in the dry soils, with small but profuse flowers, rendering it a mass of white. Its grayish stem and leaves give it a well defined appearance. It is not uncommon to find the stems two or three feet high at the time of flowering, bare of leaves below and bushy-branched above, showing little but flowers, the small and scale-like leaves upon the branches buried in the profusion of blossoms. *A. ericoides* has similar heads, but they are more scattered on the branches, so that it is much less effective in appearance. Here it is generally not so stout a plant as *A. multiflorus*, its stems being rarely more than twenty inches high and very slender. It frequents damper and often more grassy situations. In the latter part of the month of September, and on into October, *A. azureus* is one of the most abundant as well as the finest Aster in the Pine-barrens. Its range of ground is considerable, being equally at home in that which is not too moist, as well as in dry ground, in open places and also in those somewhat shaded. It adapts itself to prairies and open woods, though more common in the former. The color of the flowers is quite variable, and consists of all shades from azure blue to violet-purple. In fact, the violet shades often predominate. The stems frequently turn purple, and the leaves sometimes, especially in the full sunlight. It is about three feet high, branching freely and loosely above, bearing medium-sized heads, frequently in such quantities as to bend the rather slender stems to one side, nor does it drop its lower leaves as much as many Asters do at the time of flowering; these are so variable in form as to make its identification quite puzzling at times. There are several Asters along the margins of the ponds common and characteristic, such as *A. Tradescanti*, *A. vimineus*, *A. junceus*, flecking the coarse Grasses and Rushes, and the changing leaves of the low shrubs, with spots of pale purple and white. In the course of the fall the Asters will equal or exceed the Golden-rods in variety, coming later into bloom and lasting for a longer time.

Englewood, Chicago. *E. J. Hill.*

Plant Notes.

Some Recent Portraits.

The *Gardeners' Chronicle* issued on November 15th contains a figure of *Chrysanthemum Indicum*, made from a specimen collected by Dr. Augustine Henry "on rocks in a mountain of coniferous wood at an elevation of 8,500 feet above the sea-level at Yin-Yü-Ho in the Fang district of Hupeh. The flowers are yellow. At this altitude the plant is very graceful, delicate, and small in stature. It has quite a different aspect from the plant which occurs in ditches and valleys along the banks of the Yang-tse, near Ichang, at levels of under 1,000 feet." This interesting plant is already in cultivation in England from seed collected by Dr. Henry, and although the seedlings have not yet flowered, specimens were exhibited by Mr. Sutton at the Chrysanthemum Conference of the Royal Horticultural Society held in London last month. It is of special interest, inasmuch as it probably represents one of the original wild forms from which the modern garden Chrysanthemum has been derived. According to Dr. Henry's notes, reproduced in the pages of our contemporary, "the Chrysanthemum is known to the Chinese as the Chü-hua; and dried flowers of certain cultivated kinds are much used in medicine and form a considerable article of trade, there being an annual export of eighteen tons from Tientsin, twenty-two tons from Hankow and thirteen tons from Ningpo. The Ningpo variety,

known as Hang-chū, because it comes from the adjacent Hang-chow prefecture, is a yellow-flowered variety and sells at three times the price of the other kinds. The so-called Sweet Chrysanthemum is exported from Canton to the amount of three tons yearly, and the flowers are probably like those of some plant like *Cotula anthemoides*."

Monsieur André, in the issue of the *Revue Horticole* for November 16th, describes, with the aid of an analytical drawing of the flowers and a beautifully colored plate of the fruit here reduced to one-half its natural size, an interesting Brazilian plant of the Cucumber family, *Sicana odorifera*, which has been cultivated by our correspondent, Monsieur Naudin, the great authority on this family, in the garden of the Villa Thuret at Antibes, where the fruit which served for the illustration in the *Revue Horticole* was produced. This fruit, which is bright orange-scarlet in color, narrowly ovate and ten or twelve inches long, is exceptionally ornamental and possesses a penetrating and agreeable odor. It is the Curuba or Curua of the Brazilians, and is used by them to perfume their houses. It is edible, also, when cooked, although the flavor is not agreeable to every one. According to Monsieur André it recalls a combination of mushrooms and apple-marmalade.

The Sicana has been known for 150 years to science, having been discovered in 1636 by the German physician, George Marcgraf, who had been sent to Brazil by the Duke of Nassau to explore the coast-region between the Rio Grande and the Pernambuco. Pison, the famous Dutch naturalist, was associated with him in his scientific explorations, and between them they discovered the Curuba and published the first description of it. Later it received from Vallozo the name of *Cucurbita odorifera*, and it was Naudin, with abundant material at his disposal, who was able to discover characters which enabled him to establish his genus Sicana.

Sicana odorifera has long remained the only species of the genus. Monsieur André, however, now calls attention to a second species, of which fruit has lately been received in France from Paraguay, and for which he proposes the name of *S. atropurpurea* on account of the dark violet color of the fruit, which resembles in external appearance that of a large egg-plant. The fruit is much larger than that of the Brazilian species; the seeds are larger, longer, rhomboidal and not oval, with the basal appendage oblique. The ripe fruit is also used by the Paraguayans to perfume their dwellings. These two plants, which are perennial, the first with stems extending for a distance of twelve or fifteen feet, can be grown probably in our southern states, where the fruit would prove a conspicuous ornament in gardens.

New or Little Known Plants.

The Pelican-Flower (Aristolochia grandiflora).

THE remarkable flower, one of the very largest known, reproduced in the illustrations of the present issue was grown at Bordentown, New Jersey, by Mr. E. D. Sturtevant, who communicates the following note with regard to it:

"About a year ago a wealthy amateur residing on the Hudson River sent me some vines under the name of the 'Duck-plant,' or '*Aristolochia Pelican.*' It was said to be new, and I was unable to find any description of it in the Gardeners' Dictionary or in the catalogue of any nurseryman. Upon inquiry at Kew I was informed that it was not in cultivation there, but that it had been described and figured in the *Botanical Magazine* under the name of *Aristolochia grandiflora* or Pelican-flower. This plant has proved easy of cultivation and rapid in growth with me. In December of last year a young plant was placed in a good sized box of rich soil in a warm greenhouse. This plant in June had made a growth of twenty feet and began flowering. Many buds are now (October 1st) well developed and one is open. At first sight the plant reminds one of a large Morning Glory-vine. The flower-buds, hanging pendent in different stages of growth, form certainly one of the most remarkable sights in the vegetable world, and cannot fail to cause exclamations of wonder from persons seeing them for the first time. The resemblance to the form of a duck or pelican is very close, the head, bill, neck and body being plainly outlined. The fully developed bud measures fifteen to eighteen inches in length, and is as large as a good sized duck. This is exclusive of the long tail-like appendage. One flower fully expanded last June measured twelve by eighteen inches with forty-two inches of tail, making the total length sixty inches. At the time the bud opens the tail assumes a spiral form and appears to be intended as a ladder for the use of insects seeking to reach the flower. The centre of the flower appears like purple velvet, the inside of the throat being lined with hairs turned downward, and intended, apparently, to prevent the return of the insects caught within. The open flower, unfortunately, emits a fetid and very disagreeable odor, but this is not perceptible before it expands. I find that this plant flourishes in good loam mixed with old manure or other fertilizers. It may be planted out in a warm greenhouse or grown in a tub which can be kept in the open air during the summer and taken in before frost."

*Aristolochia grandiflora** was first described by Swartz in one of his works on the plants of the West Indies published more than a century ago. Patrick Browne found it in Jamaica and published a short account of it in his work on the natural history of that island under the name of *A. scandens*, giving to it the vernacular name of Poison Hog-meat from the reputed poisonous properties of the plant. Tussac, who published an excellent colored plate of the flower, relates that a whole herd of swine had perished from eating the roots and young stems of this plant. Lunan, in the "Hortus Jamaicensis," appears to have first given it the appropriate name of Pelican-flower, stating that "the plant is so abominably fetid that it is detested and shunned by most animals; yet when hogs venture by necessity to eat of it, it destroys them."

A. grandiflora is now known to be widely distributed in the West Indies, and extends to Central and South America, where it is by no means rare, occurring along the banks of streams usually in low, rather moist situations. It was introduced into cultivation from seeds sent to Kew from Jamaica by Mr. Purdy. It flowered at Kew in 1848, when excellent figures of the flowers were published in the *Botanical Magazine* and in other periodicals. It appears, however, to have soon disappeared from gardens, and Mr. Sturtevant's plants are the only ones, so far as we have any knowledge of the matter, which have flowered in gardens in recent years.

The figure of the fruit which appears on page 597, the first which has been published, has been prepared from a specimen collected last winter in Guatemala by Mr. John Donnell Smith, of Baltimore, to whom we are indebted for the opportunity to reproduce it.

Foreign Correspondence.

London Letter.

TINTED GLASS.—The behavior of plants when grown under colored glass has been the subject of protracted experiment at Kew. About thirty years ago some of the most important houses were glazed with glass more or less tinted with green, from the belief that this would conduce more to healthy and vigorous growth than the clear glass generally used. The ferneries were glazed with glass several shades deeper in color than the other houses for which green-tinted glass was preferred. Ferns have always been exceptionally numerous at Kew, many of the species being rare and extremely delicate. Probably the value of the collection of Ferns was the reason for the deeper shade of green in the glass used. Evidence which told against the green-tinted glass had gradually accumulated until last year it was decided to replace it with clear glass in a portion of the large tropical fernery, the reconstruction of the roof offering a favorable opportunity for making the change. The result has been most remarkable, the growth made by the plants under the clear glass being much better

* *Aristolochia grandiflora*, Swartz, "Fl. Ind. Occ.," iii., 1,566.—Tussac, "Fl. des Antilles," i., *t.* 27.—Spreng., "Syst.," iii., 752.—*Bot. Mag.*, 4,368, 4,369.—"Fl. des Serres," iv., *t.* 351, 352.
A. scandens, P. Browne, "Nat. Hist. Jam.," 329.
A. gigas, Lindley, *Bot. Reg.*, *t.* 60.
A. cordiflora, Mutis, HBK., "Nov. Gen. et Sp.," ii., 118.

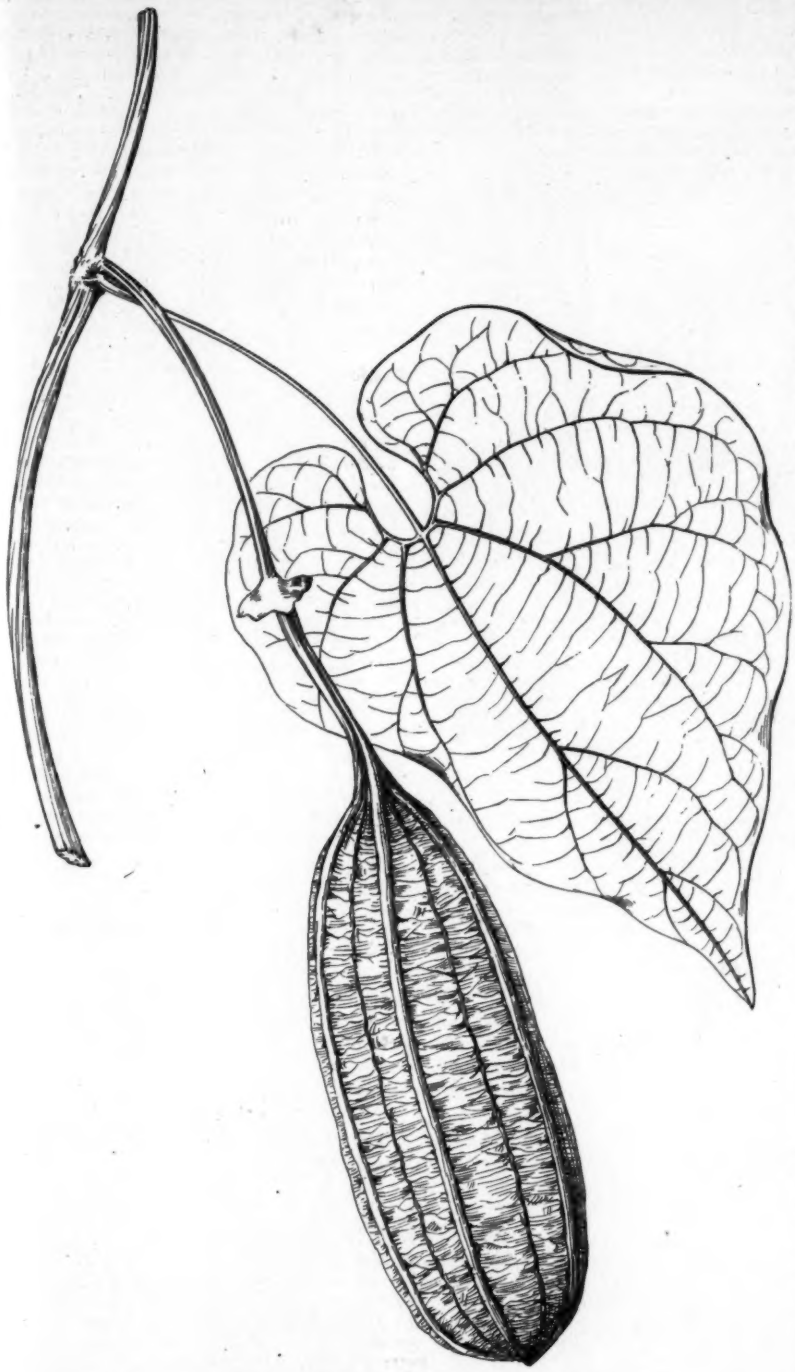

Fig. 78.—A Fruit of Aristolochia grandiflora, natural size.—See page 596.

than that of the plants under the green. The objection urged against the latter was a practical one—namely, it darkened the house in the winter, when all the light possible was required by the plants, while in summer it did not give sufficient shade to dispense with the use of blinds. Besides this, moreover, many plants also failed to grow under the green glass, although in houses glazed with ordinary glass they were satisfactory. Such were some Adiantums, some of the Gymnogrammes, Platyceriums and others. These plants are now in very fine health in exactly the same positions as they failed in before the glass was changed. Several years ago it was decided to use only clear glass in repairing the other houses. I cannot just now lay my hands on the reasons advanced by the scientists for the use of green glass in preference to clear, but I believe they were to the effect that the former transmitted exactly the kind of light under the influence of which plants grew best. This light was a sickly green, which, although not displeasing in its effect on the appearance of the plants, gave to the human countenance a peculiarly unpleasant hue.

It has taken nearly thirty years to practically demonstrate the unfitness of green-tinted glass for horticulture, and now these same results have been arrived at by Professor Henslow by scientific experiment. In a paper read at the last meeting of the Linnæan Society the Professor stated the results he had obtained by experimenting on the growth of plants under the influence of glass tinted red, yellow, blue and green, as well as under clear glass and in the open. Of these the green proved not only worse than the clear, but worse even than the red, the yellow or the blue! The best results were obtained from plants grown in the open, which is precisely what every practical man knows must be the case. If the temperature will admit of it, then all plants are better outside than when under glass. The second best results were shown by plants grown under clear glass, and here again practice is at one with the Professor. Blue proved worst after green, then red and then yellow. I have never seen red or blue glass used in horticulture, but what is considered bad glass has a yellowish tint. It all comes to this, then: pure light is best of all for plants, and the next best is that which passes through the medium that least obstructs it—namely, pure clear glass. Of course the intensity of the light is another matter. Horticulturists who use green stipple as a summer roof shade for greenhouses must substitute blinds or a white stipple if they desire to have the best results. This is a matter which deserves attention.

NITRATE OF SODA.—This bids fair to become a most valuable manure in the garden. I have seen it largely used both this year and last for Palms, Pandanads, Cycads, Aroids and other ornamental leaved plants, and invariably the results have been most gratifying. No manure that I have seen used, not even cow manure, in which I have great faith, has produced such immediate effect in the growth, vigor and full color of foliage. Mr. J. J. Willis, writing in the *Gardeners' Chronicle*, maintains that it is a most valuable factor in the production of vegetable crops and fruits. He strongly recommends it for Strawberries, Celery, Cabbages, Onions, in fact for all kitchen-garden produce. But he recommends it to be used in conjunction with ordinary manures. He says: "It may be stated that nitrate of soda is not regarded as a substitute for other manures. Taking horticulture as we find it, we recommend nitrate of soda as the cheapest and best form in which to apply nitrogen to plants. To those who are using ordinary stable manure we say, continue to use it, but use nitrate of soda in addition. . . . . With few exceptions, all the fertilizers now generally used, in proportion to the wants of the plants, contain a larger proportion of phosphoric acid, potash, etc., than they do of available nitrogen. If we desire to raise maximum crops, therefore, we must furnish available nitrogen, and the cheapest and best form in which to get this nitrogen is by nitrate of soda." Nitrogen, however, is no more a substitute for other plant food than potash is a substitute for nitrogen.

Kew. *W. Watson.*

Cultural Department.

Another Year Among Grapes.

THE grape season of 1890 proved no more satisfactory in any important feature than the two preceding ones. The variations in different vineyards but a few miles apart in the behavior of the same variety have been remarkable, and were probably due to the condition of the vines at certain stages of the weather. The Rosebug, which devastated the vineyards of south Jersey, has not yet proved serious here, though the number on my vines this year was twice as large as it was last year; but my practice is to kill every one found, if possible, which will, I hope, tend to postpone an invasion against which I shall be powerless. Aside from the leaf-roller, I have had less trouble with insects than usual. Frequent rains and dull weather at the time of blooming did more harm perhaps than any other cause. To this I attribute the imperfect fertilization of the flowers, which exceeded all past experience. A friend but a few miles distant reports his Concords exceptionally good, while mine were never a more complete failure. My theory for this difference is that a few days' difference in their blooming season gave to one vineyard good weather for pollenation and bad weather to the other.

Fungi, as usual, were abundant, but bagging heads off the rot, if applied early enough; and spraying with sulphate of copper, has kept the mildew in check, so that damage from these sources has been inconsiderable. We now fear these enemies much less than heretofore, but an old, and as yet unconquerable, foe made an invasion which brought more widespread ruin than our vines ever before suffered. This is the Anthracnose, a Fungus that attacks the young growth of the Vine as well as the fruit. In slight attacks the young cane is only discolored, and they partially outgrow the disease, but seldom, if ever, fully recover. In this stage many persons would not recognize it. A grape-grower of long experience visited me this season, and he could hardly be persuaded this was an early stage of the contagion. He only recognized it after it had developed and ruptured the tissues of the bark, showing its black spots, and had stunted or killed the young canes. As yet no certain remedy for this Fungus has been found. This disease should be a subject of experiment by our scientific students and practical grape-growers, and an effectual remedy will be as welcome as was the cure for mildew.

Fig. 79.—Side View of a Flower of Aristolochia grandiflora, much reduced.—See page 596.

The labor of combating insects and these Fungi, together with low prices for the fruit, renders grape growing for profit less enticing than formerly, and where all of these difficulties abound it is not strange that some growers are abandoning the business. When we consider that some varieties are much more liable to fungous attacks than others, it is a debatable question whether they are not more likely to appear and more virulent when they do come in vineyards containing a large number of varieties than where there are fewer. The test of a Vine's resistant qualities among a large number of varieties would be more satisfactory than if it were planted by itself.

The Vine-grower has other trials than those arising from insects and plant diseases. He must study the public taste, and the consequent demands of the market. A grape good enough for me to eat is good enough to sell, but among more than fifty varieties I find some I could not put in either class, although they are highly extolled in other sections. I add some notes on the relative value of different varieties according to my experience.

To commence with, Moore's Early, among the black Grapes, is of fair quality and size, but not very productive. It is followed by Cottage, a more vigorous and productive variety, and equal to it, if not better, in quality. Then comes Worden, larger and better than all. If it only had the skin of the Rogers' Hybrids it would be about perfection in its line. Concord, belonging to this class, will have to follow here, though with the purchasing public ninety-nine out of every hundred, and many dealers as well, regard all black grapes as Concords, and buy and sell them as such. About the same proportion of the public know but two pears, Bartlett and Seckel, and call for them at all unseasonable times. Of other black grapes that will keep longer and are better in quality, I name Wilder (Rogers' 4), Aminia (39), Barry (43), Herbert (44) and Merrimac (19), in the order named.

Of red grapes, Brighton is early and excellent, but liable to set poorly; Lindley (Rogers' 9) is open to the same objection, and so is Rogers' 32. A vine or two of Delaware I keep for its intrinsic excellence, and Berckmans will probably prove an acceptable substitute. Among the Rogers' Hybrids there is much confusion. The Aminia was so named by Mr. Bush, of Missouri, because it was one of two varieties received under the same number. I have two distinct varieties, both received as No. 32, and it is not an unusual thing to get two or three kinds in an order of twenty-five vines of the same variety, though obtained from the most reliable sources. Some of these hybrids so closely resemble each other that an error of this kind would easily escape detection among the black kinds, but when some of these turn out to be red ones the mistake is pretty palpable.

Among white grapes Niagara far surpasses all the rest. Pocklington rots and cracks badly and is too foxy. Martha is a poor apology for a grape, though the vine is vigorous and

hardy. The clusters and berry are both small. The Lady is larger in berry, earlier and much better in quality, but the vine is a slow grower and unproductive, the clusters are small, and the berries crack and rot as soon as ripe. Lady Washington, goes also. How it can be so highly extolled as it is by some good men I cannot conceive, unless it is altogether a different Grape with them from what it is with me. To look at the vine in wood and foliage it appears to be wild enough to deserve the

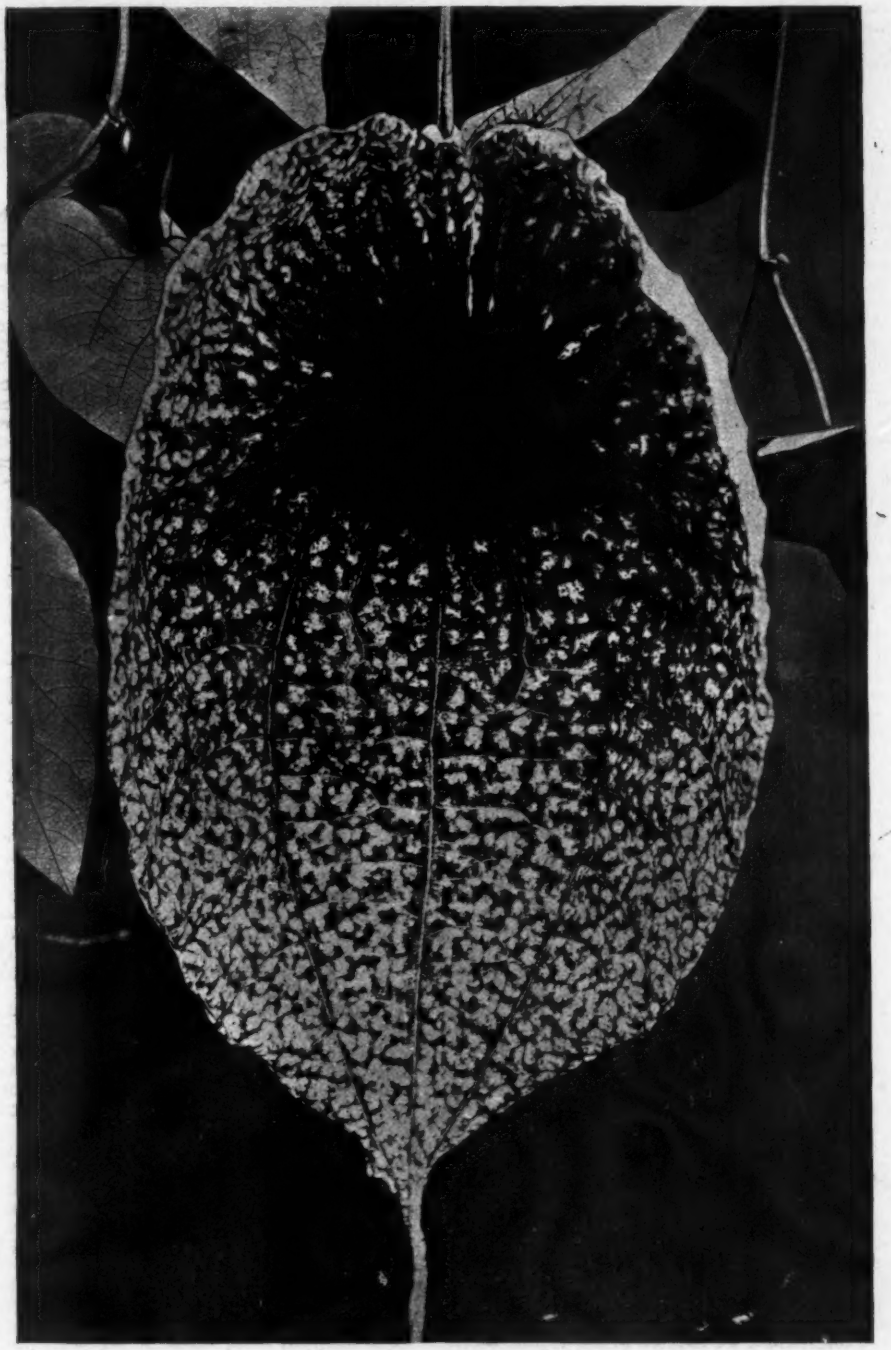

Fig. 80.—A Flower of Aristolochia grandiflora, much reduced.—See page 596.

with thinning and extra care, might give some satisfaction. Prentiss is too uncertain. Elvira, Pearl, Grein's Golden and Missouri Riessling are too poor for table use, although they may answer for wine in the west, but with me they are marked for grafting another season if possible. Noah, Jefferson and several others are to share the same fate. Woodruff Red name of iron-clad. It is productive, too; the clusters are of medium size and very compact, the berries are large, but they rot and crack before ripening, so that often half of them are wasted, and when they do ripen they are but little better than the Champion. Of a dozen vines I have, all but one or two are to be grafted with better sorts. Another highly commended

variety, Early Victor, is about as near worthless with me as any of the list. The vines are vigorous and healthy enough, and the grape itself is good, but the cluster and berry are too small. In this respect it falls below the Delaware, and anything below or equaling that in size must be of superior excellence to become popular.

Of recent introduction, Munson's Brilliant is among the promising red ones. The cluster and berry are of good size, and the quality seems up to the standard.

Montclair, N. J. *E. Williams.*

Tritonias.

THOUGH the Tritonias are less graceful than the Ixias and less brilliant than the Sparaxis, they are, I think, the most desirable for general cultivation of the smaller Cape bulbs. They are more vigorous than the Ixias, and never, like them, damp off when half grown. They lack the vivid contrast of scarlet, yellow and black with which some kinds of Sparaxis dazzle us, but they will give three flowers for every one Sparaxis yield, and these are quite showy enough, ranging from vivid orange-crimson to pure white. With Ixia and Sparaxis failure is fully as probable as success, but with Tritonia no one need miss a bountiful supply of flowers.

As in other genera of the Iris family, there is much confusion as to the species of Tritonia; probably more than half of those who have *T. crocata* call it the orange Ixia, while other sorts have been ranked with Gladiolus, Montbretia, etc. It is to be hoped that Mr. Baker's long-promised work on this family will soon be issued, so that we may have an authoritative guide. I have cultivated many of the species of this genus, and find most of them to vary much from seed without hybridizing, which, all will agree, adds a new charm to a plant, for no one will dispute as to the pleasure with which we see a new flower unfold whose counterpart no one has ever beheld. Some of these are so lovely that I shall name a few of them after speaking of the species as far as I have knowledge of them.

T. crocata is the best known of all, and, with its spike of brilliant orange flowers nearly two inches across, is showy enough to suit the most exacting. Like the other kinds it is excellent for cutting, as all buds will open, one by one, in a vase of water; this kind looks particularly bright and attractive by artificial light. *T. miniata* and *T. deusta* differ but little, horticulturally speaking, from *T. crocata*. *T. hyalina* of Linnæus is generally found in the Dutch catalogues under the name of *T. fenestrata*, given to it by Jacquin. Both names are applicable, and have reference to the fact that, at the base of the segments, color is lacking, and the tissues are transparent like windows. The general color of this species is lighter in shade than that of the other kinds. *T. squalida* is a very beautiful sort; its color is white, shaded at the tips with rose. This is regarded as a distinct species by all the botanists, and distinct it must therefore be, yet I have repeatedly raised it from pure seed of *T. crocata*. *T. scillaris* is less vigorous than the other species, but is very beautiful, bearing numerous bright rosy flowers, which, however, are much smaller than those of other kinds.

The plant called by some *T. aurea*, and by others *Crocosma aurea*, may as well be mentioned in this place. It is probably well known to nearly everybody; but, for the benefit of a possible few, I may say that it is a summer blooming kind, best treated as we treat Gladiolus. Aurea is a singularly inappropriate adjective to apply to its deep orange blossoms. It makes its new corms at the end of underground runners several inches long. When the bulbs are lifted they will be found to have more or less of these runners, without any bulbs at the end, but looking much like the pestiferous Witch Grass. These ought by no means to be removed, for they will retain their vitality until planting-time, and will then go on without delay, whereas had they been cut off there could have been no blossoms except from the old corm until new runners had grown, which would have shortened the flowering term two or three weeks. It is commonly said that in the autumn, when we lift the corms, the old ones, those we planted in the spring, ought to be discarded because they will never grow again. This is an error; they will grow again, but their growth will be comparatively unproductive of flowers. There are two varieties of this plant, Maculata, which, I believe, grows wild in Caffraria, and Imperialis, which we owe to the zeal of Mr. Max Leichtlin, or, rather, shall owe, when it is generally distributed.

T. crocata varies in its wild state, four or five well marked varieties being recognized by botanists. It varies even more in cultivation, some of the best sorts being Copper Chief, a very strong growing variety of a coppery red; Lady Rose, pink salmon ground, flecked with crimson; Maculata, flesh color, with deep crimson centre; Rubens, white, with carmine centre; Striata, pink segments, with median stripes of scarlet; Brenda, beautiful shade between rose and salmon; Bellala, segments alternately flesh color and scarlet; Hermosa, bright rose centre with salmon scarlet tips; Galatea, white, flecked and marbled with light purple; Fuego, fiery scarlet; Peach Bloom; Fenestrata speciosa, very light buff, externally light orange. Many others might be named, but enough has been said to show between what limits the colors may vary and to give an idea of the desirability of the genus. Some years ago I hybridized the white form of *Freesia refracta* and *Tritonia crocata*. Singularly enough the resulting plants bore flowers which were Freesia pure and simple, though the Tritonia was the seed parent.

Canton, Mass. *W. E. Endicott.*

Cattleya maxima.

THIS species, although by no means common, is nevertheless frequently seen in collections. It flowers from October to November, and is a fitting companion for the late flowering forms of *Cattleya labiata*. The pseudo-bulbs are more or less club-shaped and compressed, varying in length from six inches to two feet, and are furnished with a single oblong leathery leaf six to twelve inches long and about two inches broad. Some specimens are now flowering in the collection of Mr. R. H. Measures, of Streatham, bearing two or three flowers on a peduncle which springs from the top of the pseudo-bulb, enveloped at the base by a large sheath. I remember, however, seeing several plants in bloom in October of last year, and some of the peduncles had as many as ten large flowers on them. The lanceolate-acuminate sepals and the much broader, oval-oblong, wavy petals are of a beautiful satiny rose color, through which the netting of the veins may be seen, thus adding a further adornment to their appearance. The lip is tubular, much crisped at the edges, and having the same ground color as the sepals and petals, but beautifully marked with a network of deep, rich purple lines, which are closely arranged on each side of the bright yellow band, which extends down the throat and is very conspicuous.

For more than a hundred years *Cattleya maxima* has been known to scientists through the labors of Ruiz and Pavon, two Spanish botanists, who first met with it near Guayaquil, on the Andes of Peru, about the year 1777. It was not, however, until 1842 that *C. maxima* found its way alive into Europe. This was accomplished by the Royal Horticultural Society, who had sent their collector, Theodor Hartweg, out to South America in search of new plants. He first met with *C. maxima* near the banks of the Rio Grande de Melacatos, in Ecuador, where it was growing on rocks and trunks of trees. Plants were sent home, and the first flowers appeared in the Society's gardens at Chiswick in the year 1844. From this time until 1855 no trace of the plant is to be found until a pale-flowered form appeared in the collection of Mr. W. G. Farmer, of Nonsuch Park, Cheam, Surrey, and formed material for a figure in the *Botanical Magazine*. Since this period, thanks to the importations of Veitch, Backhouse, Low, Sander and others, *C. maxima* has become an established plant.

There are a few varieties known, such as Alba, having white flowers with purple reticulations on the lip on each side of the median yellow band; Aphlebia, rarely seen, and characterized by the absence of the purple lines on the lip; the variety Peruviana, commonly spoken of in gardens, which comes from Peru, and is noted for its deeper colored flowers, with more numerous and darker lines on the lip.

The cultivation of *C. maxima* (which, by the way, the late Professor Reichenbach once called an Epidendrum) is not difficult. The plants like a warm, moist house, such as Dendrobiums grow in, and will thrive in the usual compost of rough peat and sphagnum in well drained pots. They begin to grow in the autumn, at the same time as the flowers are borne on the previous year's pseudo-bulbs, and will consequently require attention as to watering during the winter months. According as the new growths appear, and the new roots begin to push through the soil, the quantity of water may be correspondingly increased. In the summer, when the growths are ripening, as much light and air as is consistent with safety should be given, so as to have the plants thoroughly mature by the autumn.

Isleworth, London. *John Weathers.*

Lonicera quinquelocularis, a native of northern India and the Himalayas, can hardly be called a highly ornamental plant when there are so many others possessing greater merit; but it is interesting on account of the profusion of fresh, clear, almost transparent fruit which it bears in the late autumn

long after the leaves have fallen. It is the only hardy bush Honeysuckle here which ripens and retains its fruit in perfect condition so late in the season. The black seeds are plainly visible within the pulp, which is somewhat mucilaginous and disagreeably bitter to the taste. The pubescent, ovate, pointed leaves are from one to two inches in length, and the flowers are small and of a light yellowish white color. In well drained and moderately sheltered situations the plants are quite hardy in this latitude, and may grow as large as the more showy flowering Tartarian Honeysuckle.

Among the climbing Honeysuckles the shining black fruit of the popular Japanese species (*L. Japonica*) is too much hidden by the evergreen foliage to be conspicuously ornamental, but at this date (November 27th) a large proportion of the fruit of *L. Sullivanti* is still full and fresh looking and of a bright red color. No other climbing deciduous species appears to keep its fruit in a fresh state so late in the season.

Arnold Arboretum. *J. G. J.*

Correspondence.

Early Chrysanthemums.

To the Editor of GARDEN AND FOREST:

Sir.—It is true, as Mr. Thorpe states in his reply to my note on September Chrysanthemums, that they will continue to be grown, but even his well known passion for these flowers does not seemingly lead him to claim much beauty for the varieties which we at present possess. It is gratifying, however, to be assured from such an authority that advances are being made in this class of plants. Some of Mr. Thorpe's early flowers were very promising this year, but only renewed tests and propagation (seemingly one of the greatest trials) will prove their value. Skillful hybridizers like Mr. Thorpe have secrets beyond the ordinary grower, and yet it is difficult to understand how varieties of which M. E. Nichols is the type are to be hastened into bloom a whole month earlier than their natural season. As a type they seem to lack the very early maturation which, with quick bud development, brings Madame Desgranges into bloom so early. The mid-season kinds seem to differ from the November ones only in the quicker development of buds, as both classes of plants form buds at same time usually.

It is hardly a legitimate occasion for criticism that any one finds pleasure in growing any flowers at any season, but, speaking for myself, Chrysanthemums are flowers to be enjoyed only in their proper character and relations. To me Chrysanthemum means profusion of bloom and great masses of color, and these, I find, can only be fully enjoyed in late October and onward. As a fancier I can appreciate flowers at any time; as the owner of a garden I find my greatest pleasures in the blooming of my flowers in their normal seasons. In a well stocked garden one instinctively separates the seasons on certain shifting lines. Certainly the emotions awakened by flowers at one season are entirely different from those produced at others. The Chrysanthemums are glorious on a frosty morning; they seem brighter and firmer in the keen air, and my pulse always beats faster, and it is always with pleasant excitement that I go among them then, to enjoy the masses of bloom and inhale their camphorous odor. What an antithesis to the earliest flowers of spring, whose sudden awakening, stimulated by the first warm rays of the sun, must, even to the most unemotional, bring a pleasure at once exquisite and sober as the mysterious forces of reviving nature are made evident! As the seasons advance the reflective gardener has with each a different set of emotions gratified. To paraphrase Mr. Warner, the gardener needs all the consolations of these pleasures.

Elizabeth, N. J. *J. N. Gerard.*

Cycles of Fruit Growing.

To the Editor of GARDEN AND FOREST:

Sir.—The culture of the sour Cherries has greatly declined in the older sections of America. The cause was the prevalence of black knot. This disease has now almost entirely disappeared, and there is no reason why there should not again be a great planting of this most wholesome fruit. If only a few trees are set by scattered cultivators there will be no fruit saved from the birds. There should be a special movement on the part of nurserymen to encourage Cherry-planting. The sorts most advantageous for the general grower covering all the northern states are the Early Richmond, the Mayduke, the large Montmorency, and the common sour Cherry, from which the Richmond and Montmorency have been improved. These are entirely hardy, and could well be grown for their beauty in blossoming season. Percival Lowell's description of Cherry worship in Corea and Japan is peculiarly fascinating. These Orientals go out in crowds at the time of Cherry blossoms, and also in Plum season, and, sitting under the trees, sip tea, write poems and become as sentimental as lovers. But aside from the flowers, the beauty of the fruit is beyond that of any other tree, and there is none more wholesome.

The time of depression for the Quince is also about over. Forty years ago it was grown very largely in the northern states. Then the borer attacked the trees and whole orchards were obliterated. The cutting of forests also made our climate subject to sharper changes, which made more protection needful for semi-tender fruits. For the last thirty years Quince-growing has been confined to a few localities. Prices have ruled very high, so that a good acre of Quinces will realize profits beyond any other fruit. Seven dollars a barrel has been the average price of first-rate quinces in this market. But the borer is gone or nearly gone; and we know how to prevent his ravages. Now, there is common sense in a general planting of this fruit once more. The requisites of success are a southern or south-eastern exposure, and protection, natural or artificial, against the north-west winds. I always bind my trees with stalks, straw or hay while young and keep them well mulched. A Quince-tree to thrive must be well fed, but not over-fed. Use coal ashes abundantly about the trees.

Another fruit that should come back about now is the currant. I think that in proportion to the population we do not have half the currants that were grown in 1850. The twig-borer is gone, and the currant worm is very easily managed by two sprinklings of hellebore. The market for this delightful fruit is never overstocked.

When I was a boy there were four fruits specially abundant: plums, currants, cherries and quinces. No one imagined they could get on without them. They had their cycle of growth, then a cycle of decadence; now we may replant. The plum is already finding its old place, but the quince, cherry and currant are scarce. Our only chance of successful competition with birds and insects is to plant enough for both the birds and ourselves and together whip the insects. We cannot succeed without an alliance with our friends in the air. The probability of their multiplying beyond reasonable numbers is very slight, except in such an abnormal case as the English sparrow; but we must furnish them food.

Clinton, N. Y. *E. P. Powell.*

The Forest.

Systematic Timber-cutting in Quebec.

THE following remarks are translated and condensed from a paper presented in French to the American Forestry Association at its meeting of September 2d, 1890, by Mr. J. X. Pirrault, Secretary of the Quebec Forest-Association:

Now while the destruction of the state forests is carried on so systematically that it is possible to foretell the fatal moment when the province of Quebec will be stripped of its most valuable forest-trees, it is a public duty to make a last appeal to the patriotism of the men who govern us to put an end to the vandalism of which we are every day the witnesses.

For more than a century the public domain has been pillaged with the thoughtless consent of the state. What was once the finest forest-property in the world has been ruined by pasturage, and by the wasteful methods of lumbermen who, not content to make enormous fortunes at the expense of the Province, have cut and destroyed everything in their path without thought of the future.

Our neighbors in the United States have acted with the same want of forethought, but with this difference, that with a population ten times larger than ours the destruction of their forests has gone on more rapidly. Never, perhaps, in the history of any people has there been seen the administration of a public domain so criminal and so disastrous.

The forests of the United States, from the Atlantic to the Pacific and from the frontiers of Mexico to those of Canada, cover 450,000,000 acres. The annual cutting over of 25,000,000 acres gives on an average 4,800,000,000 cubic feet of lumber. The railroads use, in addition, 500,000,000 feet, the mines 150,000,000, fences consume 500,000,000; 150,000,000 feet are exported, while 18,000,000,000 feet are consumed as fuel. The whole forms the enormous total of 24,000,000,000 feet, of an approximate value of $1,000,000,000—that is to say, more than the total value of the crop of wheat, rye, oats, potatoes, cotton and tobacco produced in the United States, and thirty-three per cent. more than the value of all exportations of every kind from that great country.

It is hardly conceivable and yet it is true that no forest-administration has been charged with securing intelligent

management of this colossal property. It has been truly said that the real riches of a country are not in its deposits of the precious metals, but in its forests, and yet, thanks to the folly of the Government of the United States, these fruitful sources of public wealth have been allowed to perish without any thought beyond the morrow.

Some idea of the enormous traffic which springs from forests of the United States may be gathered, perhaps, from the fact that in Chicago alone the 2,000,000,000 feet of wood and lumber which are handled in that market represent 1,000 car-loads for every working day in the year. If all the forest-products of the United States were moved by rail, we should have a train equal in length to eleven times the circle of the globe at the point of its greatest diameter. The northern states alone produce two-thirds of this lumber each year, or about 20,000,000,000 feet, worth three hundred millions of dollars. This represents a weight of 500,000,000 tons, and would require a fleet of 500,000 vessels, each of 1,000 tons burden, to transport it—that is, a tonnage equal to twice the fleets of the entire world.

This forest-wealth of the United States has been so used and abused that already the richest forests have disappeared. The pine of Michigan, Wisconsin and Minnesota, once considered inexhaustible, exist no longer. They have been exterminated; and this is readily understood when it is remembered that a single mill in this region has cut half a million feet a day, and that the capacity of all the mills of the United States is more than 60,000,000,000 feet a year. According to the Census report, there were in 1880 55,175,000,000 feet of pine standing. Since that time 45,475,000,000 have been cut, so that in all the northern part of the United States there is now only two years' supply of white pine of the best quality left, with more or less pine of inferior quality.

The improvidence of the Government, and the insatiate desire to grow rich rapidly, have brought our neighbors' forests into this condition. It seems almost incomprehensible that a nation so intelligent and practical can allow itself to be despoiled of one of the principal sources of national wealth while it was so easy to render it perpetually productive.

And what have we done ourselves here in Canada? Have we not committed the same blunders? Has not our public domain been pillaged also? How many millions have been sent from Canada during the last fifty years to enrich the people of London? Our Pine-forests have nearly disappeared. The timber of which we were once so proud has vanished. The pine, which is now found only between the Red River at the west and Migen at the east, does not extend north of the forty-ninth degree of latitude in the valley of the Ottawa and the fifty-second degree in the region of Albany Lake. There is none north of Lake Superior. Our best Pine-forests were in the valleys of the Ottawa, of the San Maurice, of the Saginaw and their tributaries. All these have been destroyed, and now it is necessary to go 300 miles from Ottawa to the headwaters of the San Maurice and to Lake St. John to find lumbermen at work. All that immense forest-territory of the province of Quebec, of more than 100,000 square miles area, would represent to-day hundreds of millions if the state had managed it intelligently. But here, as in the United States, every one supposed our forests were inexhaustible. They have been cut without pity and without rest.

The Government was deaf to every appeal to protect the public forests as long as a few hundred thousand dollars, derived from the forest, was available to make up the deficit of the general administration. The sale of limits made often to political partisans, most often fraudulently and at prices absolutely ridiculous, have almost entirely ruined our forests. Great bodies of timber have been sacrificed at ridiculous prices in time of panic when there was no demand for timber. In 1844 the Government, among other limits, sold one of 100 square miles for $4 a square mile—that is to say, at the rate of two acres for one cent. Is it possible to imagine any greater folly in the administration of Government affairs? The results of these wasteful methods are apparent. The cut of pine east of Montreal, which amounted two years ago to 250,000,000 feet, has now fallen to 25,000,000—that is to say, to an annual output of only ten per cent. of the former production—and this for the excellent reason that there is no more pine to cut in that region. It is the price of the ruin of the forest-capital of the province which the government of Quebec has received and still receives every year. We have obtained as a gift from our fathers a forest-domain unequaled in the world. It was able every year to produce an enormous revenue, sufficient, if properly administered, to meet all the expenses of the state. And we have not been sufficiently intelligent to administer this property in such a way as to perpetuate the revenue for our children. On the contrary, without regard to the most elementary rules of forest-culture, we have alienated the forest-domain by throwing it open to a crowd of greedy speculators whose only other aim has been to destroy it entirely. Such criminal conduct merits the contempt and reproof of the whole world. The province of Quebec is not alone culpable. Ontario, New Brunswick, Newfoundland are even worse off than we are, and when the forest-resources of the Canadian confederation are examined, it is only too apparent that in a comparatively short time we shall be obliged to depend for our timber upon other provinces. British Columbia, on the Pacific side of the continent, is well wooded, but her forests are too remote to be of practical value to us here in the east. The timber supply of British Columbia will be needed by her own people and by those of the north-west. Her timber can be sent to Australia, California and South America more advantageously than to us here. From the Rocky Mountains to Lake Superior timber is scarce. It is disappearing rapidly in Ontario; and in the maritime provinces and in all the eastern counties consumption is increasing and the supply is disappearing very rapidly.

It is evident, then, that the province of Quebec must adopt at once the methods which are everywhere recognized as necessary to stop this destruction and assure by means of an intelligent administration the perpetuity of what remains of our forest-domain. It is necessary, in a word, to inaugurate here a system of regular cutting such as is practiced in France, Germany and other civilized countries, where not only the annual output is preserved, but the extent and value of the forests are steadily increased. The government of Quebec should, in order to preserve its forest-domain and increase for all time its productive capacity, adopt the following plan:

First. It should divide the public domain into five great forest-regions—namely, Ottawa, San Maurice, Saginaw, the counties of the east and the Gaspasie—and place each under the direction of a general forest-officer. Each of these forest-officers should then divide his region into as many forests as there are distinct regions, each composing a certain number of limits.

Each forest should be worked, under the direction of a forest-officer of the region, by a timber-merchant, owner of a saw-mill, and such a forest should be cut once in every twenty years or more, according to the nature of the soil and the trees which are found in it. In this way every year a twentieth part only of the forest would be worked; the remaining ninety-five per cent. will be left to its natural growth and protected against all inroads from the lumberman or his employees. By cutting each year trees only which have arrived at their full value, those preserved would be ready for the axe twenty years after. In this way a forest will perpetuate itself indefinitely, yielding constantly an equal and regular annual product without deterioration.

Second. Every year the Government should determine what will be the amount of timber called for by the needs of commerce in order to avoid the over-stocking of the market and the commercial disasters which result from over-production and the consequent shrinking in value of forest-products.

Third. As is well known, the squaring of timber in the woods, by which the soil is covered with chips, is an imminent cause of fire, and a third of the wood moreover is lost by this means. The Government should demand that all trees should be sawed, not hewn, or floated down the streams in convenient lengths to points of shipment.

Fourth. The Government should exercise an intelligent inspection over the operations of lumbermen, and it should be the duty of the general forest-guards of each region to mark themselves, or to have marked by their assistants, all trees to be cut or to be reserved in the annual cutting.

Fifth. The Government should send to the Forest-School at Nancy a certain number of young men who, having followed the course there in forest-studies, would be fitted later to assume the direction of our woods and forests.

Sixth. As the management of our woods and forests belongs to the department of the Minister of Agriculture, the general forest-guards should be placed under the direction of that officer in all matters relating to the valuation and exploitation of the forest-domain.

It will perhaps be argued that these indispensable forms will entail serious expenses on the Government. This is a mistake. It is simply a redistribution of duties and a transfer of the Government employees, which is necessary in order to put this system in operation.

And after all, a forest-domain of 50,000 square miles is well worth the trouble and expense of some attention. It produces

annually something like 400,000,000 feet of pine and 110,000,000 feet of spruce, besides 37,000,000 feet of red and white pine timber, 600,000 feet of hard wood, 4,500,000 railway ties, besides vast quantities of cedar, tamarack and 5,000,000 feet of fire-wood; the whole producing a revenue to the province of a million dollars. The total annual forest-product for all Canada amounts to $25,000,000, and this will double certainly as wood becomes rarer in the United States. In a few years from now the province of Quebec will obtain from her forests a revenue sufficient nearly to meet all her expenses, provided an intelligent forest-administration can be established. We still have in our forests and in our waste land hundreds of millions of dollars with which can be assured the greatest prosperity of the province, but it is necessary that the men who govern us should realize the urgent necessity of administering wisely this magnificent inheritance upon which depends the future prosperity of the nation. And especially is it necessary that they consider the rights of the coming generation and determine to protect this inheritance against the attacks of the short-sighted and thoughtless.

Recent Publications.

North American Fauna. No. 3. Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona. By C. Hart Merriam, M.D., United States Department of Agriculture, Division of Ornithology and Mammalogy. Washington, 1890.

This is the outcome of a careful biological study of the San Francisco-mountain region of Arizona, and although Dr. Merriam's studies are principally devoted to vertebrate animals, his paper contains much which is of direct interest to botanists, but interesting as it is, the results, as has been well pointed out in the *Botanical Gazette*, are specially "valuable in that they mark out a line of botanical work which the Government should at once enter upon and push to its completion."

Dr. Merriam deals with the general subject of geographical distribution, and the conclusions which he reaches are, that there are two life areas in North America, a boreal and a subtropical, both extending across the continent with long interpenetrating arms. He abandons therefore the three life areas generally accepted by naturalists—namely, an eastern, a central and western—establishing, however, in the particular region discussed seven lesser life zones, four of northern and three of southern or mixed origin. The correlation of the northern zones with corresponding zones in the north and east are pointed out.

Dr. Merriam first treats of the Alpine zone, which embraces the bleak and storm-beaten summit of San Francisco Mountain, which rises to an elevation of 11,500 feet. Nine of the species of plants growing here were collected by Greeley on the shores of Lady Franklin Bay, and many of them are found scattered over the mountain ranges in all the northern parts of the continent. It appears "that many of the plants found on the high rocky summits of San Francisco Mountain occur on the higher peaks of the Rocky Mountains, the Sierra Nevada and Cascade range, and the Appalachian chain. They occur along the arctic coasts of Alaska, Hudson Strait, north Labrador, Greenland, north Siberia and Spitzbergen; they occur in the Alps of Europe, in the Altai and Ural Mountains, the Pyrenees, and some of them even in the Himalayas. In brief, they inhabit the arctic regions of the globe and extend far south on the summits of the higher mountain ranges. Plants and animals having such a distribution are termed Arctic-Alpine Circumpolar species."

"Just below the barren arctic summit of the mountain is a narrow belt which may be named the Timber-line zone. Here the trees which reach timber-line (in this case *Picea Engelmanni* and *Pinus aristata*) lose the upright or arborescent habit and exist as stunted and prostrate trunks, whose gnarled and weather-beaten forms bear testimony to the severity of their struggle with the elements. In this narrow belt a number of hardy little plants attain their maximum development, decreasing rapidly in abundance both above and below. Many of them are circumpolar species found throughout the northern regions of America, and some of them throughout the northern regions of the world, coming south on high mountains, and occurring in greatest perfection just at or near the edge of the northern limit of trees, and at timber-line on mountains further south. Such plants are known to botanists as 'sub-Alpine' species, and it would be well if the term sub-Alpine were restricted to the characteristic species of this zone."

"Passing down into the next zone, the Spruce-zone, a number of plants, birds and mammals are encountered which are characteristic of humid northern regions, but regions not quite so cold as those inhabited by the species which occur on the snowy summit and at timber-line. The characteristic trees of this zone are Engelmann's Spruce (*Picea Engelmanni*) and the Fox-tail Pine (*Pinus aristata*). The fact of present interest is that many of the plants here enumerated as growing in the Spruce-zone of this mountain are equally characteristic of the upper Spruce-belt of the higher Alleghanies, the Rocky Mountains, the Cascades and the Sierra Nevada, and occur also in the great northern Spruce-forest of Canada. It is well known that the northernmost part of our continent consists of bare rock and frozen tundras. There are no trees along the sea edge of Labrador or Hudson Strait, or along the coast region of arctic America from Boothia Felix to Alaska, but just south of this region a large forest begins which has been called the Great Pine Forest. There is not a Pine-tree in it, but it is called Pine because conifers in general are called Pines by people who are not botanists. The tree that grows there is a species of Spruce congeneric with the Spruce which occurs high up on San Francisco Mountain, and many of the humbler plants are either identical or closely related representative forms."

"The distinctive tree," of what Dr. Merriam calls the Canadian or Balsam Fir-zone, "is the Douglas Fir (*Pseudotsuga taxifolia*), which ranges northward to British Columbia. Another tree of nearly coincident vertical distribution on the mountain is the lofty Rocky Mountain Pine (*Pinus flexilis macrocarpa*), which extends north to the Kootenai region and Calgary, in Canada. Wherever the Douglas Fir has been burned off its place is taken by the Aspen (*Populus tremuloides*), a species of wide distribution in the north, where it ranges from New England to Newfoundland and Labrador, and thence westward to Alaska, reaching its highest perfection along the southern part of the great coniferous forest of northern Canada, and coming south in the mountains." In this belt Dr. Merriam found such plants as *Geum triflorum*, *Potentilla fruticosa*, *Actæa spicata* and *Viola Canadensis*, all of wide distribution in our northeastern flora, as well as a Ceanothus representing a western-American genus, with two species penetrating into our eastern flora.

The next natural division is called by Dr. Merriam the Neutral or Pine-zone. "The characteristic and only tree of the Pine-zone is *Pinus ponderosa*, which forms an unbroken forest over the whole of the lava plateau above the altitude of 7,000 feet, and extends up as high in some of the parks as 8,800 feet. As a distinctive species, however, it loses its character at about 8,200 feet, where it is invaded and soon after replaced by *Pinus flexilis*, *Pseudotsuga taxifolia* and *Populus tremuloides*. *Pinus ponderosa* may be regarded as a tree of the middle elevations, occurring between the Piñon and Cedar of the lower hills and the Firs and Spruces of the higher mountains. In such situations it ranges from the highlands of western Texas and northern Mexico, northward along the Rocky Mountains and Sierra Nevada to the dry interior of British Columbia, in latitude fifty-one degrees thirty minutes, avoiding the region of excessive rainfall along the coast from northern California northward."

Next below is the Piñon-zone:

"The distinctive trees of this zone (6,000-7,000 feet) are the Piñon or Nut Pine (*Pinus edulis*) and the so-called 'Cedar' (*Juniperus occidentalis monosperma*), both averaging about sixteen feet in height. The singular checker-bark Juniper (*Juniperus pachyphlæa*), a very handsome and conspicuous species, occurs in two or three special localities, but is rare. Several large shrubs not observed elsewhere are abundant in parts of this belt, namely, *Berberis Fremontii*, *Rhus aromatica*, var. *trilobata*, and *Spiræa discolor*, var. *dumosa*. Both the Piñon and Cedar occupy elevations of corresponding temperature in the arid lands from western Texas through New Mexico and Arizona and northward to central Colorado, and the Cedar reaches westward to southern California. Closely related and strictly representative forms extend northward through the Great Basin to the Plains of the Columbia. The other species mentioned occupy more or less of the same range, and some of them push northward over the Great Plains as well as the interior basin."

Space will not permit us to reproduce Dr. Merriam's account of the desert of the Little Colorado, the so-called "Painted Desert" of the earlier explorers, which he crossed and recrossed several times. The extracts we have laid before our readers are sufficient, however, to call attention to the importance and interest of this publication, which is by far the most considerable contribution to our knowledge of the plants and animals of a peculiarly interesting region which has yet appeared.

Notes.

The Massachusetts Horticultural Society will offer $3,800 next year in prizes for flowers and plants.

Fifty-six Chrysanthemum shows in as many towns and cities have been reported so far this year in the *American Florist*.

The death is announced of the German landscape-gardener, Niepraschk, the author of many important parks and gardens in different parts of Germany, and in recent years Director of the Garden of Flora at Cologne.

Not less than $1,600 was taken from the sale of tickets to the Chrysanthemum exhibition recently held in Boston by the Massachusetts Horticultural Society. Financially this was one of the most successful exhibitions ever given by this Society, the receipts being double those of last year at the corresponding exhibition.

Pierre Tschihatheff, the distinguished traveler and naturalist, has recently died in Florence. He is known by his French translation of Grisebach's "Vegetation der Erde," which he enriched with many original notes, and by his great work on the natural history of Asia Minor. It was for him that the Pyrethrum, now used successfully in dry countries to form turf in the place of grass, was named.

Our figures of the Aristolochia this week will recall the interest which was excited by the flowering in Kew last spring of *Aristolochia Goldieana*. The plant was described as so small that it could be crumpled in a man's hand, while the great white-tubed flower was too large to conceal in a peck measure. The interior of the flower was strangely beautiful, too, with its pencilings of purplish chocolate on a ground of old gold. *Aristolochia longecaudata*, mentioned last week, is one of the most distinct and handsome of the unilabiate group.

Tuberous Begonias, Herbaceous Pæonies and Chrysanthemums are to be added next year to the list of flowers for which the so-called prospective prizes are established by the Massachusetts Horticultural Society. These prizes are offered for the best seedling raised by the exhibitor and shown for three years consecutively. Many seedling plants, notably Chrysanthemums, produce good flowers at their first blooming, and then deteriorate, and eventually prove worthless. Under the plan adopted by this Society the raisers only of well tried varieties are rewarded.

There were 136 seedling Chrysanthemums shown at the Philadelphia exhibition, and, according to John Thorpe, who acted as one of the judges, one out of every five had genuine and distinct merit. It may be added that Mr. Thorpe speaks with disrespect of that "scale of points" which had been devised to secure an accurate estimation of the quality of Chrysanthemums. He says that the judges made only one mistake, and that was in a case where they attempted to cipher out the value of a Chrysanthemum by a sum in arithmetic. After that the "scale of points" was discarded.

A correspondent of the *American Architect and Building News*, while confessing that no definite solution of the building problems involved in the "World's Fair" at Chicago has yet been arrived at, says that, "according to the best authorities, the Committee now expects to report with suggestions for buildings substantially as follows," as regards those in which our readers are most interested: "Agriculture, 1,200 feet long by 400 feet wide, with annex for power-house"; and "Viticulture, Horticulture and Floriculture, to be built in the form of a cross, each of the four wings being 200 by 150 feet, and the central rotunda 200 feet in diameter. An annex for heating boilers is also suggested for this building."

The *Popular Science Monthly*, quoting from a lecture on museums by Dr. G. Brown Goode, says that the earliest general collection shown to an American public was formed by a man named Arnold, at Norwalk, Connecticut, prior to the Revolution, and consisted of birds and insects. It first awakened an interest in scientific matters in President John Adams, who visited it several times "as he traveled from Boston to Philadelphia, and his interest culminated in the foundation of the American Academy of Arts and Sciences." But, it is added, the history of American scientific museums had its true beginning with the establishment of the Academy of Natural Sciences in Philadelphia in 1812 and the New York Lyceum of Natural History.

The *Builder* recently described a little church at Greensted, in Essex, England, which, although built of wood, has stood for a thousand years, and is still in constant use. Its chancel is of brick, and seems to have been added in the sixteenth century; but the nave, which is thought to have originally been the whole of the building, and to date from the latter part of the ninth century, has only a plinth of brick, upon which rests a sill supporting the walls, which are formed of planks so thick as to be almost logs, about four and a half feet long and two or three feet wide. These walls are windowless, light entering only through dormers in the roof, which is of shingles and is not more than forty years old.

Mr. Maries, the well known collector, gives in the London *Garden* the following account of how *Primula obconica* was introduced: "When I was traveling in central China I was much puzzled how to bring out living plants 1,100 miles to the coast at Shanghai. I, of course, took plants of the things I thought were the best for garden purposes, but Ferns and herbaceous plants were altogether out of the question. I thought, however, that many seeds would germinate if they were kept in soil, so I collected surface soil from about Ferns and Primulas and other plants. This was kept in an old wine box, and eventually taken to Hong-Kong. I took this home twelve months afterward, and the soil was 'sown' in a glass house. The first thing that came up was *Primula obconica* in large quantities, several shrubs and a lot of Ferns. I have often seen remarks in *The Garden* about the native habitat of *Primula Sinensis*. This grows wild in all the gorges leading to the Yang-tse River above Ichang. Where I stayed, there in a cave temple, a few miles above Ichang, the clefts in the rocks above and below the cave entrance were full of *P. Sinensis* in immense tufts in full flower. This was in February."

Some systematic experimental work has been carried on at the Botanic Gardens of Georgetown, Demerara, since the seminal fertility of Sugar-cane has been proved. It has been established that propagation by seed in ordinary field cultivation will never be adopted, because in a great majority of varieties two years are required from the time the seed is sown before the seedlings mature, or fifteen to eighteen months are needed from the time they are strong enough to be planted out in the open ground. Besides this, the delicacy and slow growth of the cane in its infancy is an insuperable obstacle. The practical use that can be made of seedling cane is in obtaining new varieties. These seedlings vary very widely, and they have a marked tendency to improvement. In many cases the advance in quality and size of the cane has been remarkable. It is hoped by the Director of the Botanic Garden that the canes may be increased in size and weight and that the sugar content may be increased also. It is not improbable that in addition to these essential qualities the cane may be improved in habit of growth, resistance to drought, degree of earliness, percentage of fibre, etc., so that it is not impossible that a marked advance in sugar culture will be made from these seedlings.

The variety of uses to which the bark of the Cork Oak is put in southern Europe, as indicated in a report of United States Consul F. H. Schenck, will surprise most American readers. "Although," he says, "what gives most value to cork are the bottle corks, still it has other applications, some of considerable importance, such as plates or slabs for use on boilers, room carpets, the making of rugs, life-preservers, cork-dust bricks, hats, album-covers, picture-frames, jewel-boxes, bracelets and other objects of adornment; soles for shoes and boots, wheels of small dimensions for railroad cars, and the grease-boxes of the wagons; and recently it is applied as 'Corcho larminado,' or ornamental slabs, the invention of Don Buenaventura Reull, of Barcelona, which is employed to cover plane surfaces and curves, employing them as carpets and for other uses. They make, moreover, huts for those who work at cork, and in Turkey they make cork coffins. In Italy they make images and crosses, shoes, horse-saddles, horse-shoes, arms, blacking, fortifications, furniture, soles for shoes, wadding for mortars, and obtain lampblack for printing in the United States, and the round or hollow cork is especially employed in the province of Valencia to husk rice. It is also used for bee-hives, pans and pails to deposit or carry milk; in ornaments in gardens, for relief maps to form the elevations, for floats in fishing apparatus, for pails where they cool water with ice or snow, etc. From the imperfect combustion of cork is obtained Spanish black, a product much esteemed for making printers' ink." To this we may add that artists in Italy and Spain carve pictures in relief in cork which have much the appearance of being moulded of terra-cotta; and that the packers of fruit for export now seem to prefer a coarsely granulated cork to the traditional sawdust packing.